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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,591	11/13/2003	Wei Zou	H0005211 (HON0002/US)	8998

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EXAMINER

KORNAKOV, MICHAEL

ART UNIT	PAPER NUMBER
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1746

DATE MAILED: 02/15/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/712,591

Applicant(s)

ZOU ET AL.

Examiner

Michael Kornakov

Art Unit

1746

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 December 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16, 29 and 30 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16, 29, 30 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Applicants' amendment dated 12/05/2005 is acknowledged. Claim 1 is amended. Claims 29 and 30 are new. Claims 17-28 are cancelled. Claims 1-16, 29,30 are currently pending and examined on the merits.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 1-12, 15, 16 stand and claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Maekawa et al (U.S. 5,846,335).

Maekawa teaches a method of removing microscratches on the surface of semiconductor wafer by providing pressure and relative movement between the substrate and a polyurethane cleaning member (reads on "polishing pad", as instantly claimed), **while applying aqueous solution to the surface of semiconductor wafer**, thus polishing the wafer surface (col.2, lines 26-31,35-37; col.6, lines 20-27; paragraph, bridging col.6 and 7; col.9, lines 34-50).

The method of Maekawa comprises providing a semiconductor wafer having a surface with microscratches and abrasive particles left from the previous polishing step (reads on "a planarization process", as instantly recited); removing most of the abrasive particles from the surface of semiconductor wafer by scrubbing; removing minute particles, submicron particles and microscratches from the surface of semiconductor wafer by applying uniform pressure to the rotating cleaning member with the application of water containing cleaning solution and without application of abrasive particles at this

Art Unit: 1746

stage, thus keeping contact between the semiconductor wafer surface and the cleaning member.

Maekawa does not specifically indicate the average density of microscratches of certain sizes on the polished surface, as per the instant claims 1-6. However, it is noted here that the processing steps of Maekawa are identical to those instantly claimed and therefore the recited parameters as per the instant claims 1-6 are reasonably expected within the teaching of Maekawa.

Regarding the specific limitation of claim 7, which is concerned with chemical-mechanical planarization, Maekawa teaches that the polishing was performed with alkaline based solution (col.9, lines 27-33).

Regarding claims 11 and 12, reciting processing parameters, such as pressure between the polishing pad and the substrate and rotational speeds of the substrate and polishing pad, it is noted here that such parameters are result effective, because, on one hand, they affect the speed of removal of some surface material and therefore efficiency of the polishing process, and, on the other hand, the desired quality of the polished surface, especially its roughness and the presence of microscratches of certain width/depth. However, discovery of optimum value of result effective variable in known process is ordinarily within the skill in the art and would have been obvious, consult *In re Boesch and Slaney* 205 USPQ 215 (CCPA 1980). As to the specific dimensions of the substrate and polishing pad, it is noted here that 4 to 8 inches diameters of semiconductor wafers are conventionally utilized in the art and to choose the proper diameter of the polishing pad to polish such wafers is within the skills of ordinary skilled

in the art. Furthermore, 4 to 8 inches substrates are conventionally polished with polishing pads of larger diameters, which is evidenced by He (U.S. 6,783,437), who teaches the wafer of 8 inches in diameter being polished with polishing pad of about 20 inches in diameter (col.7, lines 37-47).

Regarding claims 15 and 16, Maekawa teaches that his cleaning method may be any of various steps of the semiconductor fabrication process (col.9, lines 51-55) and therefore one skilled in the art motivated by Maekawa would have found obvious to further process the semiconductor wafer of Maekawa, wherein a component of a magneto resistive memory device, such as a giant magneto resistive device may be formed upon necessity and with the reasonable expectation of success.

4. Claims 1-10, 13, 14 stand and claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Sotozaki et al (6,494,985).

Sotozaki teaches a method of polishing a semiconductor wafer to a flat mirror finish, thus reducing microscratches on the wafer surface. The method of Sotozaki includes the steps of normal polishing, water polishing and scrub cleaning with water, thus reducing microscratches on the wafer surface. The scrub cleaning is performed by providing pressure and relative movement between the wafer and polishing pad, while applying **pure water** to the wafer. The polishing pad of Sotozaki comprises a polymer (col.8, lines 25-43; paragraph, bridging col.13 and 14; col.14, lines 21-25, 34-38). Sotozaki specifically indicates supplying pure water to the polishing cloth and wafer surface in order to remove the abrasive liquid therefrom, the abrasive liquid including the abrasive particles (paragraph, bridging col. 8 and 9).

Sotozaki does not specifically indicate the average density of microscratches of certain sizes on the polished surface, as per the instant claims 1-6, 13. However, it is noted here that the processing steps of Sotozaki are identical to those instantly claimed and therefore the recited parameters as per the instant claims 1-6, 13 are reasonably expected within the teaching of Sotozaki.

Regarding claim 14, the recited water quality is conventionally utilized in the art for polishing and therefore the use of such water will be obvious within the teaching of Sotozaki.

5. Claims 15, 16 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Sotozaki et al (6,494,985) in view of Han et al (U.S. 6,583,953).

While teaching that polishing the semiconductor substrate is conventionally utilized on different stages of semiconductor manufacturing, Sotozaki does not specifically indicate manufacturing a giant magneto resistive device. However, manufacturing a giant magneto resistive device requires some conventional steps, including polishing the semiconductor substrate, utilized for the manufacturing of such device, which is indicated by Han (paragraph, bridging col.4 and 5). Therefore one skilled in the art motivated by Han and Sotozaki would have found obvious to utilize the polishing technique of Sotozaki while producing the giant magneto resistive device of Han with the reasonable expectation of success.

Response to Arguments

6. Applicant's arguments filed 12/05/2005 have been fully considered but they are not persuasive.

Applicants argue that "Nowhere does the Maekawa et al. reference disclose or suggest providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles after leftover abrasive particles are removed from the substrate to polish the substrate.". In response, Applicants' attention is drawn to col.2, lines 49-53; col.7, lines 53-55 of Maekawa, wherein the use of aqueous cleaning solution in such step is specifically indicated.

Applicants also argue, that "The Sotozaki et al. reference does disclose or suggest providing pressure and relative movement between the substrate and a polishing pad with application of aqueous liquid and without application of abrasive particles after leftover abrasive particles are removed from the substrate to polish the substrate. The Sotozaki et al. reference only discloses removing such leftover particles during a water polish step". In response, Applicants' attention is drawn to col.8, lines 51-67; col.9, lines 1-18 of Sotozaki, wherein such sequential steps are clearly indicated. Furthermore, Applicants' attention is drawn to the fact that selection of any order of performing steps is prima facie obvious in the absence of a new and unexpected results, consult *In re Burnhans*, 154F.2d690, 69 USPQ 330 (CCPA 1946); *Ex parte Rubin*, 128 USPQ 440 (Bd.App.1959).

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

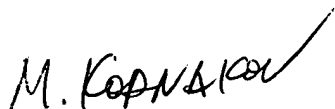
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael Kornakov whose telephone number is (571) 272-1303. The examiner can normally be reached on 9:00am - 5:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Barr can be reached on (571) 272-1414. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Art Unit: 1746

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read "M. Kornakov", with a long, sweeping flourish extending to the right.

Michael Kornakov
Primary Examiner
Art Unit 1746

02/10/2006